REMARKS/ARGUMENTS

Claims 1 – 12, 14, 15, 17 and 18 are in the application. Reconsideration is respectfully requested.

Claim Rejections 35 USC § 102

Claims 1 and 7 have been rejected as anticipated by the disclosure of Youssefmir et al, US Patent Number 6,141, 567. After considering the Examiner's responsive comments made in paragraphs 13 and 14 in the office action, applicant respectfully traverses this rejection in light of the following remarks.

Youssefmir discloses a system in which a first downlink beamforming weight is calculated by conventional methods from a set of primary data. In order for the conventional method to operate successfully, it is necessary for "training data or other characteristic information" to be known about the primary data which are received at an antenna array (see column 3 lines 35 to 65). The only disclosures of 'other characteristic information' within Youssefmir can be found in column 2, lines 49 to 65; this section also discusses 'blind' methods.

Once an accurate first downlink beamforming weight has been generated by conventional means, a second signal transmitted from a mobile transceiver (a set of secondary data) is utilized to modify the accurate first downlink beamforming weight to generate a new (less accurate) second downlink beamforming weight. In contrast to the calculation of the accurate downlink beamforming weight, the second, less accurate, downlink beamforming weight does not require 'training data or other characteristic information.' In other words, the second signal transmitted from the mobile station to the antenna array is used to 'steer' the first downlink beamforming weight without the computationally expensive analysis necessary to determine an accurate second downlink beamforming weight.

In contrast to the method disclosed in Youssefmir, the present invention generates a downlink beamforming weight vector by estimating an uplink beamforming weight vector, identifying uplink nulls and an uplink main beam position from the uplink beamforming weight vector, transforming the uplink nulls to form corresponding downlink nulls and generating a downlink beamforming weight vector from the downlink nulls. *At no point does Youssefmir*

discuss identifying uplink nulls and an uplink main beam position from an uplink beamforming weight vector.

The invention, as defined by Claim 1 of the present application is, therefore, not anticipated or suggested by the disclosure of Youssefmir.

Turning more specifically to the methods disclosed in Youssefmir, the Examiner has accurately identified the only section within Youssefmir which discusses downlink nulls (column 18, lines 5 to 10). This section states that downlink nulls should be directed towards interferers, wherein the location of interferers are determined from 'secondary data' (that is, the data which does not have associated characteristic information). Therefore, the positions of the nulls in a method according to Youssefmir are determined by considering the secondary data from which no uplink beamforming weights have been calculated (instead, it is assumed that DOA information is utilized).

Therefore, there is clearly no disclosure of uplink nulls and an uplink main beam position being determined from the uplink beamforming weight (as no uplink beamforming weight is calculated from the secondary data). Furthermore, at no point does Youssefmir discuss the identification of uplink nulls or their transformation into corresponding downlink nulls (as required by Claim 1 of the present application). Instead, the only disclosure made in Youssefmir regarding nulls states that the uplink nulls should be directed towards interferers. This is a direct teaching away from the formation of a downlink beamforming weight by identifying uplink nulls and using their location to position downlink nulls.

Claim 7 has been amended here to conform with claim 1 as respects the steps of "*identifying uplink nulls* ...;" "*transforming each of said uplink nulls* ...;" and "*generating downlink beamforming weight* ... ." No new issues are raised by this amendment. Accordingly, applicant respectfully requests entry of this amendment to claim 7, which renders the claim allowable for the reasons set forth above in connection with claim 1.

In paragraph 4 of the office action the Examiner rejects claims 2 and 6 as being obvious in view of the combination of Youssefmir and US 4,173,759 (Bakhru) and US 5,555,257 (Dent). In response, applicant notes that claims 2 and 6 are allowable in combination with their now allowable base claim 1.

Moreover, applicant submits that obviousness rejection is improper inasmuch as it relies on a combination of non-analogous prior art. A skilled person would not make the combination suggested by the Examiner as each of the documents is directed towards different systems, each of which possesses their own respective problems.

For example, Youssefmir is directed towards a general wireless transmission system and in particular towards the use of a 'personal handy phone system' (PHS). In contrast, Bakhru is directed towards a missile communications system. A skilled person considering a problem with cellular telephones would not consider a document concerning interference caused by jamming signals directed towards a missile as being relevant.

Furthermore, Bakhru does not disclose the claimed steps of: "*categorising each of said uplink nulls as either bad uplink nulls or good uplink nulls, reassigning all bad uplink nulls to form corrected uplink nulls, and forming downlink nulls by scaling the phase of both said good uplink nulls and corrected uplink nulls according to a factor that it is related to the ratio of the downlink operating frequency to the uplink operating frequency.*" Indeed, Bakhru merely states that the method disclosed does not suffer from unwanted nulls at the exact location of the desired information signal. The mere disclosure that the Bakrhu method does not suffer from unwanted nulls is not a teaching which would render unpatentable the subject matter of claims 2 and 6.

The Examiner has raised further objections in relation to dependent claims 3 - 5, and 8 - 10. These claims are all allowable in combination with their now allowable independent claims 1 or 7.

As respects independent claim 11, the Examiner, in paragraph 9 of the office action, rejects this claim as obvious in view of Youssefmir and Dent and Bakhru. As noted above, applicant believes that the combination of references made here draws upon unrelated features from documents concerned with different areas of technology and directed toward solutions of quite different problems. Thus, applicant submits that this rejection is improper as relying upon a combination of non-analogous art.

Even if a skilled person were to make the Youssefmir-Dent-Bakhru combination suggested by the Examiner, claim 11 would still be patentable over the combined disclosures. In particular, none of the prior art documents discloses the features of: "*dividing the communication cell into a plurality of sectors, identifying uplink nulls which would yield pseudo nulls in a sector, and*

constraining use of the system to those terminals in a sector which no pseudo nulls would be generated." Accordingly, a prima facie case of obviousness has not been made in accord with MPEP § 2143, which recites in pertinent part:"[T]*he prior art reference (or references when combined) must teach or suggest all the claim limitations.*"

The Examiner is correct in stating that Dent discloses a form of sectorization. However, Dent does not disclose the null constraint method used by the present invention, which causes the formation of pseudo nulls. Indeed, Dent does not even discuss the possibility of pseudo nulls or how their existence may be detrimental to the effects of a communication system.

The Examiner suggests that Bakhru teaches that a problem encountered with certain antenna arrays is the existence of a null in the exact direction that an information signal is being received. However, as discussed above, the mere disclosure that poor resolution in the defining of null positions, which causes nulls to be formed in the exact direction that an information signal is being received, does not constitute a disclosure regarding the pseudo null formation problem which is tackled by the present invention.

Indeed, there is no disclosure in Bakhru that any attempt should be made not to use a sector in which a pseudo null would be generated, and the sectorization discussed in Dent is disclosed in relation to problems concerning, for example, frequency re-use. These problems do not correspond to the problems addressed by the present invention. Therefore, a skilled person would not make the combination suggested by the Examiner and such a combination would not result in the present invention defined by claim 11.

In paragraph 10 of the Office Action, the Examiner rejects independent claim 12 as being obvious in view of the disclosure of Youssefmir, when combined with that of US 6,615,024 (Boros). The argumentation presented above in relation to claim 1 also applies to this claim. Since the features of claim 12 that are common with those of claim 1 are not disclosed in either Youssefmir or Boros, the present invention defined by claim 12, as well as its independent claim 15, is also patentable over a combination of the teachings of those two documents.

In paragraph 11 of the office action the Examiner rejects claim 14 as unpatentable over the disclosures of Youssefmir, Boros and Dent. As noted above, applicant believes that the combination of references made here draws upon unrelated features from documents concerned with different areas of technology and directed toward solutions of quite different problems.

Thus, applicant submits that this rejection is improper as relying upon a combination of non-analogous art.

Even if such a combination of teachings were to be made by a skilled person, then the argumentation presented in relation to claim 11 applies equally to claim 14 of the application. Consequently, claim 14 and its dependent claim 17 is believed to be allowable.

In relation to independent claim 18 (to which paragraph 12 of the office action relates), the Examiner has failed to make a distinction between the *uplink* wavelength and the *downlink* wavelength, or to take into account the reasoning for any such spacing. Instead, the Examiner has combined a disclosure regarding a downlink wavelength used when scanning a signal across an antenna array (from US 5,349,364 - Bryanos) with a disclosure regarding either uplink or downlink wavelength (from US 5, 714,932 - Castellon). This combination is not a combination that would suggest itself to a person of ordinary skill in the art. In particular, the antennae spacing disclosed in Bryanos is directed towards solving different problems as compared to the spacing in Castellon. Furthermore, neither of these two documents discusses the null wrapping phenomenon to which this particular claim is directed. Therefore, the present invention defined by claim 18 not anticipated by nor rendered obvious in view of the prior art documents cited by the Examiner.

Conclusion

In view of the foregoing, applicant believes that all of the currently pending claims are in condition for allowance, and an early notification to that effect is respectfully requested. If the Examiner has any questions, he is invited to contact applicant's attorney at the below-listed telephone number.

Respectfully submitted,
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